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INFORMATION CIRCULAR

METHODS OF SOME PROGRESSIVE MINING COMPANIES IN PLACING RESPONSIBILITY FOR MINE ACCIDENTS

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METHODS OF SOME PROGRESSIVE MINING COMPANIES IN PLACING RESPONSIBILITY FOR MINE ACCIDENTS[1]

By D. Harrington[2], C. W. Owings[3], and F. E. Cash[4]

Effective supervision is now being generally accepted as one of the best means of reducing accidents and of maintaining a live safety spirit in any industrial organization. Of equal importance is the establishing of responsibility for all accidents and of placing the blame irrespective of those at fault or of their position in the organization. Having located the responsibility, the duty of the supervisory force is to discipline in some manner or other the guilty person or persons. If this simple procedure is followed, accidents will decrease to a marked degree; if there is failure to take definite punitive action of some nature upon occurrence of trivial accidents, there is every probability of their recurring with much additional severity.

While each employee should be impressed with his responsibility for working safely and for maintaining his working place in a safe condition, the employer has at all times (at least, should have) a very definite share in the responsibility for the safety of every human being who works in or around the plant. A western coal-mining company formerly relied upon the miner to place posts when or where he pleased or upon mine officials to visit the working places and to instruct the workers where to place posts to support the roof. Under such a scheme (by far too frequently in effect) by which the company itself tried to avoid responsibility and to throw responsibility on the officials, the accident-frequency rate was high, as usually - in fact, necessarily - must be true where such lack of system prevails. Several years ago the company determined to shoulder its share of the safety responsibilities in so far as falls of roof were concerned, and a definite system of timbering was adopted for rooms. Posts were required to be placed 3 feet apart in rows spaced 4 feet apart; a safety post was also required in the center of the room, not more than 3 feet from the face. Each miner was instructed in the system and was impressed with the importance of adhering strictly to it; the penalty for failure to observe this rule was dismissal without warning, and this penalty was rigidly enforced. As a result of this system falls of roof accidents have been reduced and no fatal accident from this cause has occurred since 1927. The increase in safety is directly attributable to the assumption of risk by the company in adopting a definite timbering system and then of placing responsibility for safety on the workman and on the officials as well, rather than on only the officials who can not spend more than a few minutes each shift in any one working place. In this instance supervision has

1 - The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from U. S. Bureau of Mines. Information Circular 6211."

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become more effective through the proper placing of responsibility; and the institution of rigid discipline has completed the necessary links to make the chain effective.

Most certainly the workman is not always responsible for accidents; and all accidents, even those of trivial nature, should be promptly and rigidly investigated and the conditions considered with utmost impartiality. In the weekly reports of a prominent progressive mining company the following account appears:

> Injured man was picking slate from car while standing near the face, with his left foot on top of the rail. Mule boy came up and hooked tail chain to car and started to pull car down the heading, when the injured's left foot was caught under a car wheel, resulting fracture to toes. Injured claims mule boy did not tell him he was going to move car; however, foreman should reprimand men when caught standing in this position, as cars are liable to be moved any time. The foreman of these men should caution them to be more careful before moving cars, while men are working around them. This is lack of good foremanship.

Three men were responsible for this accident, but the man directly responsible was the foreman who neglected to instruct his men in safe practice. Another accident, recorded in the same report, again illustrates the proper placing of responsibility and lack of adequate supervision.

> Injured was loading coal in No. 2 room near the face, under blind pot with some coal hanging overhead; while loading, the coal fell from roof and struck injured on right foot, resulting contusion to right ankle. If injured had taken down all loose coal he would have noticed the blind pot and probably prevented this accident. Foreman should have instructed this man to always take down loose coal before loading. Men should be cautioned more of this hazard.

It is true that every miner should be his own safety inspector, but there are many unsafe practices with which he is unfamiliar and therefore he needs supervision of an experienced official. Even the supervising official can not always insure safe operation of the mine, and this is especially true when the management requires him to operate unsafe equipment or the engineer or other responsible official lays out the mine workings in an unsafe manner. The description of the following three accidents illustrates the results of lack of supervision by the management; the responsibility for the accidents rests directly with the management:

> (1) Injured was pulling machine back and was holding feed chain to keep it straight, in sheave; feed chain was badly worn, causing it to slip, caught his left hand, resulting in contusions to left index finger. This accident could have been avoided by replacing this worn feed chain with a new one.

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(2) Injured was walking by motor No. 1 on diagonal west at car spray. Motor lights blinded him and he stepped on a lump of coal and fell, spraining his left ankle and knee. This accident could have been avoided by injured watching where he stepped and by the side of the track being filled level with the top of the ties.

(3) Injured was uncoupling trip of empties from Motor No. 3 to carry them into 3rd So. with locomotive No. 13. Just as injured started to pull coupling out, the motorman pulled the trip, and injured's hand was caught between top of coupling pin and end of car. Injuries resulted in lacerations of 3rd and 5th left fingers and amputation of the 4th left finger. Doctor's estimate of lost time, 30 days. Foreman states that this accident or a similar (one) could have been prevented by having a chain and ring in the top of coupling pin with which to hold the coupling pin. Motorman on No. 3 motor states that he thought injured had finished uncoupling the cars and had given the signal to pull them.

In establishing the responsibility for accidents, investigators are prone to blame the workman with carelessness, in accordance with the now rapidly disappearing policy of always shelving responsibility by the employer. Such an attitude does not help to prevent similar accidents, for unless the basic cause for an accident is determined, no remedy can be suggested for the prevention of other accidents of similar nature. If all accidents are assigned to "the carelessness of the worker," (which is the tendency even yet among many employers) he will assume that it is useless to take precautions, as he will be blamed anyway for any accident which may occur. On the other hand, if the men see that responsibility is placed where it belongs, even if this "hits" the boss or the company, a spirit of cooperation in accident prevention will be manifested, at least in time, among all employees. In the cases cited above, it is safe to assume that the average investigator of mine accidents would have reported the accidents as resulting from "the carelessness of the workmen." It is readily seen that defective equipment or practice for which the management was wholly responsible was the basic cause of the accidents. The management must assume its share of the responsibility for accidents, and that share includes practically all accidents if accidents are to be decreased and if supervision is to become effective. This doctrine of management responsibility for essentially all accidents is opposed by many operators, but until this doctrine is established and accepted there can be little improvement in the admittedly poor accident record of the mining industry.

One of the functions of a supervisor is to discipline those under his direction for infraction of rules. This may include reprimanding, suspending, or discharging. The following accidents are illustrative of various means of placing responsibility and of enforcing rules by varying degrees of discipline:

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Injured was driving mule, handling cars; he had pulled one loaded car from drag to the side track and was going back to drag with one empty car, riding on the front bumper of car. Just before he got to the drag, the mule turned from the track and injured allowed car to roll down and catch his left leg between the empty and loaded car standing near the drag. Injured should be suspended if riding on the front bumper of car, which was a rule violation; he should have been on the rear of the car, also should have been in position to stop car with sprag or break stick before running into other car ahead. Foreman should caution men against this hazard and unsafe practice.

Not only is the violator of the rule to be disciplined, but the foreman should also use this accident as an example to illustrate what may occur if the rules are violated.

Injured claims he was riding on bumper of car when cars jammed together catching his right knee between the two cars, resulting contusion and abrasion of knee. The above is statement made to doctor; we have no report from foreman. Superintendent should reprimand this foreman for not making report on this injury. Injured should be cautioned to be more careful handling cars.

The accident just described is similar to the foregoing one, and the treatment of violators of safety rules should be the same; for example, the mule driver should be suspended. The neglect of the foreman in not reporting the accident is recognized and discipline is recommended.

Injured man was breaking a large piece of slate with sledge, when piece of slate struck him in the left eye, resulting inflamed eye. Additional supply of screen goggles have been ordered by superintendent, and men having to break rock and slate will be furnished with these goggles. The men reported in the safety meeting last Monday night that the screen goggles furnished to be tried out are satisfactory and they want to wear them when breaking rock. Men were cautioned to use them when necessary.

An analysis of accidents evidently indicated that a large number of preventable eye injuries were occurring and to overcome this type of injury goggles were tried out and found to be satisfactory in the prevention of accidents. The company assumes the responsibility of the eye injury and has taken steps to overcome similar accidents. A caution to the men breaking rock was sufficient discipline in this case.

Injured claims that he attempted to sprag car with sprag and got his finger caught between sprag and pipe line; however, his foreman reports this man "chocked" a car with a rock and when he went to remove rock, the car wheel caught his little finger of left hand, resulting amputation of end of little finger. This man will be suspended for doing his work in a careless manner. Foremen should caution men to do their work in a safe manner. "Chocking" cars with rocks is a violation of rules; should use sprags provided for this purpose.

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In the foregoing accident, violation of a rule was evident, and the man was disciplined by being suspended. The foremen are reminded that such an accident should be used as a basis for pointing out the dangers involved in blocking cars with rock or similar "chocks" and to stress the disciplinary action that will be taken for every infraction of the rules.

> Injured man was quarrying down rock at 5 right side slope when a large rock fell on muck pile and broke, and one piece of this rock fell over on injured's foot, resulting contusion to great toe. Foreman should instruct his men to stand in a safer position, while quarrying rock, expecting rock to fall at any time.

Some accidents are not easily foreseen and are difficult to prevent; in the foregoing case it was deemed sufficient to use the accident as the basis for warning the men of danger of falling rock while "quarrying." It seems that if this class of accident is frequent, the company is to blame for not supplying the men with long levers for quarrying or pulling down loose material or for failure to introduce safety shoes or toe guards among the workers. Whatever type of accident occurs, a study of it may be used to determine the relative responsibility of the workman, of the foreman, or of the management, and no accident should be allowed to pass unnoticed and without comment. This is well illustrated by the following excerpt from a recent weekly safety report:

> There was a leak in the pipe line leading to face; injured was trying to tighten 2-inch air valve on this line when valve stripped the threads on the pipe, blew off, striking drag engine and bounced back striking injured on right leg, resulting compound fracture to leg. Valve had been screwed on defective pipe threads by pipe fitter; however, injured should have cut off pressure from line before attempting to repair leak at valve. Pipe fitter suspended and injured reprimanded for carelessness.

Although the injured man exhibited carelessness in repairing the pipe while the pressure was on the line, the real blame rests with the pipe fitter who did not make a safe connection, hence it was just to place the responsibility for the accident on the pipe fitter and to discipline him. The need of rigid discipline is shown by the following accident:

> Injured loaded a bad order drill on car behind motor. He placed the drill on the car crosswise and left handle sticking out on side of car about 10 inches and while passing by chain, the drill caught on the butt-stick behind mule, throwing the drill over on injured man, catching his right forearm. Injuries consisted of contusions to forearm just above wrist. This man was told not to load drill on car crosswise as it would not clear, but he did not pay any attention to what was told him and loaded the drill on car in unsafe manner and was injured. We can't expect safety in mines when we have men of this kind that disregard safety, to himself or others. This man was discharged July 11. Foremen must see that instructions and rules are carried out.

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Supervision, to be effective, requires that orders given by the supervisor shall be carried out. When an employee persists in disobeying regulations and instructions, drastic action is necessary; otherwise the supervisor's position is likely to be one of uselessness rather than one of usefulness. In this case dismissal was justified, and the probable result will be that other workmen will not disobey a similar rule.

> There were five empty cars spotted for loading; the motor trip came in with 10 empties and was going to couple to the five standing and leave five more empties for the loader. The injured attempted to couple the cars being handled by motor to cars standing while motor trip was in motion; in doing this the corner of the first car in the trip struck him on hip and knocked him against the loader pan, resulting abrasions and contusions to both hips. This man violated rule by trying to couple cars while in motion or make a flying coupling. This man should be suspended and foreman should caution all other men of this hazard and instruct them that the company rules must be carried out. At this particular location, if the motorman had not stopped when he did, this would have been a fatal accident.

The accident just described serves to illustrate several points. (1) The accident was the result of an infraction of the safety rules. (2) The responsibility for the accident rests with the injured man who violated the rules. (3) The infraction of the rule justified the discharge of the injured man. (4) The foreman was to blame in part, as he had not impressed the employee with the meaning of the rule or probably had on previous occasions been too lenient with offenders and so failed to command the respect of this man. (5) Although the injuries did not result in a fatality, the injured man may have been killed if the motorman had not been quick to act. Many so-called minor accidents may result in fatalities and for that reason no accident is too small to merit the most minute investigation. Supervision should not be restricted to the more spectacular accidents, but should be extended to include all unsafe practices and accidents. By constantly calling the attention of each employee to his responsibility for safety (and accidents) the foreman is being a more effective supervisor, his supervision is better, and his work also becomes easier. The decreased accidents resulting from following such a procedure are well defined in an account by E. H. Denny in U. S. Bureau of Mines Information Circular 6150, entitled "The unusually good safety record of a coal mine and of a coal mine foreman," published in May, 1929.

The feeling of responsibility for safety must be fostered among all employees of an organization from the highest official down to the lowest-paid laborer. One of the best means of attaining this end is the issuance of regular safety letters or reports. The value of the safety-letter method of maintaining interest has been brought to the attention of the mining public by the authors of this circular in Information Circular 6101, Safety Letters, published in January, 1929. The safety director of one of the companies from which many of these data have been obtained issues a weekly report for the foremen of all

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departments. In additon to listing the nature and cause of the accidents, a summary of accidents by departments is made, showing the "Lost time this week," "Lost time last week," "Total for this month to date," and "Total for last month." In addition to this comparison, the following tabulation is generally included:

REPORT OF SAFETY RULES VIOLATED AND UNSAFE PRACTICES CORRECTED BY FOREMEN FROM ALL WORKS SINCE LAST REPORT

Department	A	1	reported	Department	F	3	reported
Do	B	3	do	Do	G	2	do
Do	C	0	do	Do	H	18	do
Do	D	0	do	Do	I	0	do
Do	E	1	do	Do	J	0	do

Total violations reported this week - - - - 28
Total violations reported last week - - - - 41.

A tabulation like that above should have a decidedly favorable effect on the supervision and will direct attention to responsibility for safety. The tabulation may be interpreted in at least two ways. (1) The man with the greatest number of violations reported may take the attitude that he is an especially efficient supervisor, for he has been able to detect a large number of infractions of the safety rules. He probably will exert himself to greater effort to detect violations. (2) The man who has reported no violations may consider that he has so well supervised his men that they are not breaking the rules, and he will then exert himself even more to hold to a minimum the number of violations in his department. In either case the effect will be to make the foremen more keenly feel their responsibility.

Still another means of directing attention of the foremen to their responsibility for accidents and of increasing safety is well illustrated in the following abstract from the report of a company safety engineer:

> The number of accidents at our mines in the first four months of this year (1929) is greatly in excess of the first four months of 1928. <u>This increase is in the number of accidents to company men</u>.
>
> Seventy-five per cent of the accidents this year have been to company employees. This is discouraging and it would appear that the company men are taking chances. The man who does not try to do his work in the safest manner possible is doing both himself and his family an injustice.
>
> The number of accidents to miners at our mines are below the average, and I feel that the miners are trying to do their part in the safety work.
>
> Below is a list of the accidents at each mine for the month of April - company men on one side and miners on the other.

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Look over this good and you will observe that the company men are greatly in excess of the miners both in accidents and days of disability.

In justice to ourselves and our families, can we allow this to continue?

Month of April

Accidents to company men	Mine	Accidents to miners
7 with 182 days of disability	A	0
3 do 37 do do do	B	4 with 33 days
1 do 3 do do do	C	2 do 15 do
1 do 14 do do do	D	0
5 do 98 do do do	E	0
1 do 120 do do do	F	0
6 do 209 do do do	G	9 do 86 do
2 do 150 do do do	H	0
26 with 813 days of disability		15 with 134 days

The effect of pointing to the fact that the company men were causing the greatest number of accidents is well emphasized in the following, quoted from the report of this safety engineer for June:

The past month was the best month we have had since the safety movement began. The number of accidents and the days of disability are smaller than any month in the past.

The number of compensable accidents were the same as in May, 12, but the probable days of disability on these accidents were 396 or 191 days less than last month.

There were no compensable accidents at A and B mines. This was the fifth successive month without compensable accidents at A mine.

COMPARISON OF ACCIDENTS TO
COMPANY MEN AND MINERS AT OUR MINES

APRIL

To company men 26 with 813 days disability
To miners 15 do 135 do do

MAY

To company men 15 with 482 days disability
To miners 10 do 232 do do

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JUNE

Accidents to company men	Mine	Accidents to miners
1 with 42 days disability	A	0
1 do 30 do do	B	2 with 58 days disability
1 do 14 do do	C	1 do 10 do do
1 do 14 do do	D	1 do 21 do do
2 do 58 do do	E	1 do 28 do do
3 do 47 do do	F	0
3 do 16 do do	G	0
0	H	2 do 86 do do
12 with 251 days disability		7 with 205 days disability

There were no accidents to company men at H mine.
This month shows a very favorable decrease - Let's Keep It Up!

When the attention of the foremen was directed to the large number of accidents to company men, each foreman apparently made a strenuous effort to reduce accidents among this class of workers and the result is shown by the rapid decrease in days of time lost; 813 days of disability in April, 482 in May, and 251 in June. There is no doubt that before the analysis of accidents which brought out the high accident incidence among company men the foremen and the company men were shirking the responsibility placed upon them, but when the high accident rate was pointed out the supervision of the foremen increased, they assumed their rightful responsibility for accidents, and impressed in one manner or other upon the company men their responsibility for working in a safe manner.

Another large coal company realized that responsibility was not assumed by their employees, including the supervisory officials, and a drastic system of discipline was inaugurated whereby upon the first infraction of a safety rule an employee was warned, on a second offense he was laid off from work for a few days, and on a third he was discharged. The supervising officials were given definitely to understand that they were held responsible for accidents. The result of enforcing these rules was most gratifying, and the decided decrease in the accidents is shown in the table following:

COMPARISON OF ACCIDENTS AT A COAL MINE

First 6 months of year	1927	1928	1929
Falls of roof	27	18	7
Loading, mining	17	10	7
Haulage	67	23	13
Ventilation	3	-	-
Electricity	9	-	1
Miscellaneous	59	26	7
Totals	182	77	35
ACCIDENTS			
Fatal	1	1	-
Permanent partial disability	4	3	2
Temporary disability	44	38	14
Slight injury	129	36	19
Days lost	10,534	10,767	1,364

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This record speaks for itself and clearly shows how accidents may be reduced if safety is an integral part of the operation of the mine. Such a record is only possible when safety starts from the top and is passed down through every official to the mine laborer and miner. Before this is possible each supervising official must be convinced of the merits of safety and be willing to assume full responsibility for the safety of the men entrusted to his care. Then and then only may we expect to reap the benefits of any safety campaign.

Finally, the backbone of safety lies in the ability of the mine officials to cause each worker to take an interest in real safety in connection with his work.

BE YOUR OWN SAFETY INSPECTOR

A miner - more than almost every other kind of worker - must be his own Safety Inspector.

In shops, furnaces and other work places, men work together in groups, and the foreman is always on hand or in sight to see that they work safely or to caution them. In mines the men are scattered and work, more or less, by themselves, or with a helper or "buddy." It is impossible to provide enough foremen to watch all the men in the mines at all times.

This of course should not be necessary. Miners are taught to take care of themselves and how to prevent accidents, and if they would always do what they know or have been instructed to do for their own safety, there would be fewer accidents.

Don't take a chance in the absence of your foreman; always work safely and you will be on the safe side.

BE YOUR OWN SAFETY INSPECTOR. MAKE SAFETY <u>YOUR RESPONSIBILITY.</u>

The ideal to strive for is well expressed by a safety engineer in the following:

WHAT "JOB INTEREST AND SAFETY" MEANS

When it is said of a man that "he takes a lot of interest in his work and safety" what does this statement mean?

If you were to look up such a man's record you would find the following facts about him:

1. He follows all instructions willingly.
2. He is constantly trying to do better work, more of it and in a safer method of doing his work.

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3. He takes good care of company property and materials and is always on the alert to prevent waste and personal injuries.
4. He is clean, orderly and careful in his work.
5. He is always agreeable and works well with others; he is a team worker and a safe man.

These are qualities which you may be sure, every company appreciates. These qualities will also enable a man to get ahead in his particular class of work, no matter what it may be.

CONCLUSION

Present-day advanced safety practice in industry places responsibility for accidents and their prevention directly upon the employer. Self protection on his part forces him to resort to intensive supervision and to discipline, which in order to make these even reasonably effective must be supplemented by educational activities of various kinds. Of prime importance is the education of the supervisory officials, since they very obviously can not tell their employees what to do or not to do unless they themselves know what is safe as against what is unsafe in mining, including methods, practices, equipment, installation, etc. One of the best methods of becoming acquainted with what is unsafe in mining is to make a minute study of all accidents, trivial as well as serious. This study should be made by someone not responsible for the existing conditions; this is true not only as to observations on the ground but also as to tabulating and interpreting the occurrences. Each week, or at least each month, a statement should be issued concerning surrounding conditions in connection with every accident, trivial or otherwise, which has occurred during the period, and in the statement the responsibility should be placed and the preventive action indicated. Preferably these reports should be bulletined or issued in form of a safety letter or a safety paper, or in some similar manner, giving all employees the full benefit of any lesson to be gained by the accident. The old-time practice of "covering up" or "soft-pedalling" accidents and their contributing conditions by "passing the buck" as to responsibility is fast being cast aside by mining companies which really wish to prevent accidents.

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